



# Company Presentation



The Frequency Control Expert for over 20 Years

Masterclocks



Frequency Distribution Units



Rubidium Oscillators  
& Atomic Clocks





# Who we are



- ✘ **“AXTAL”** stands for **“Advanced XTAL Products”**, where **“XTAL”** is a common abbreviation of “crystal”.
- ✘ **Founded in November 2003** by Bernd Neubig and Brigitte Neubig as fully privately owned company. Since 2023 the AXTAL GmbH is an independent subsidiary of **Q-Tech Corporation**, a US-based leading supplier of high-reliability crystal oscillators
- ✘ **Core Business** comprises advanced Frequency Control Products (FCP), i.e. mainly Crystal & SAW Oscillators and Frequency & Timing Modules. All products are ITAR free.
- ✘ **Main Product Focus** is on High-Reliability Oscillators and Frequency Control Modules with high requirements for environmental conditions, ultra-low noise performance, very high stability and frequency generation up into the GHz range for applications like microwave communication, test equipment, radar, military, aerospace and space.
- ✘ **Full Value Chain** includes R&D, design, manufacturing, screening and testing of our products from samples to production quantities completely in-house.
- ✘ **Extended Product Portfolio** includes quartz crystals & crystal filters for high-reliability applications and atomic frequency standards, which are sourced from our contract partners.



# Where we are

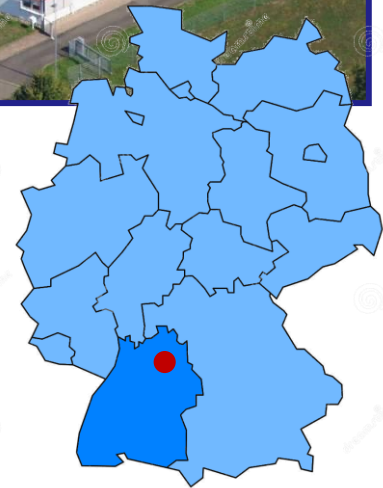


## AXTAL GmbH

**Facility & Administration:**  
(Billing & shipping address)  
Roemerring 9  
D-74821 Mosbach  
Germany



*AXTAL is currently planning to expand and will move to a newly build facility in 2026 with more than 3 times the current space.*



+49 6261 939834



contact@axtal.com "General"



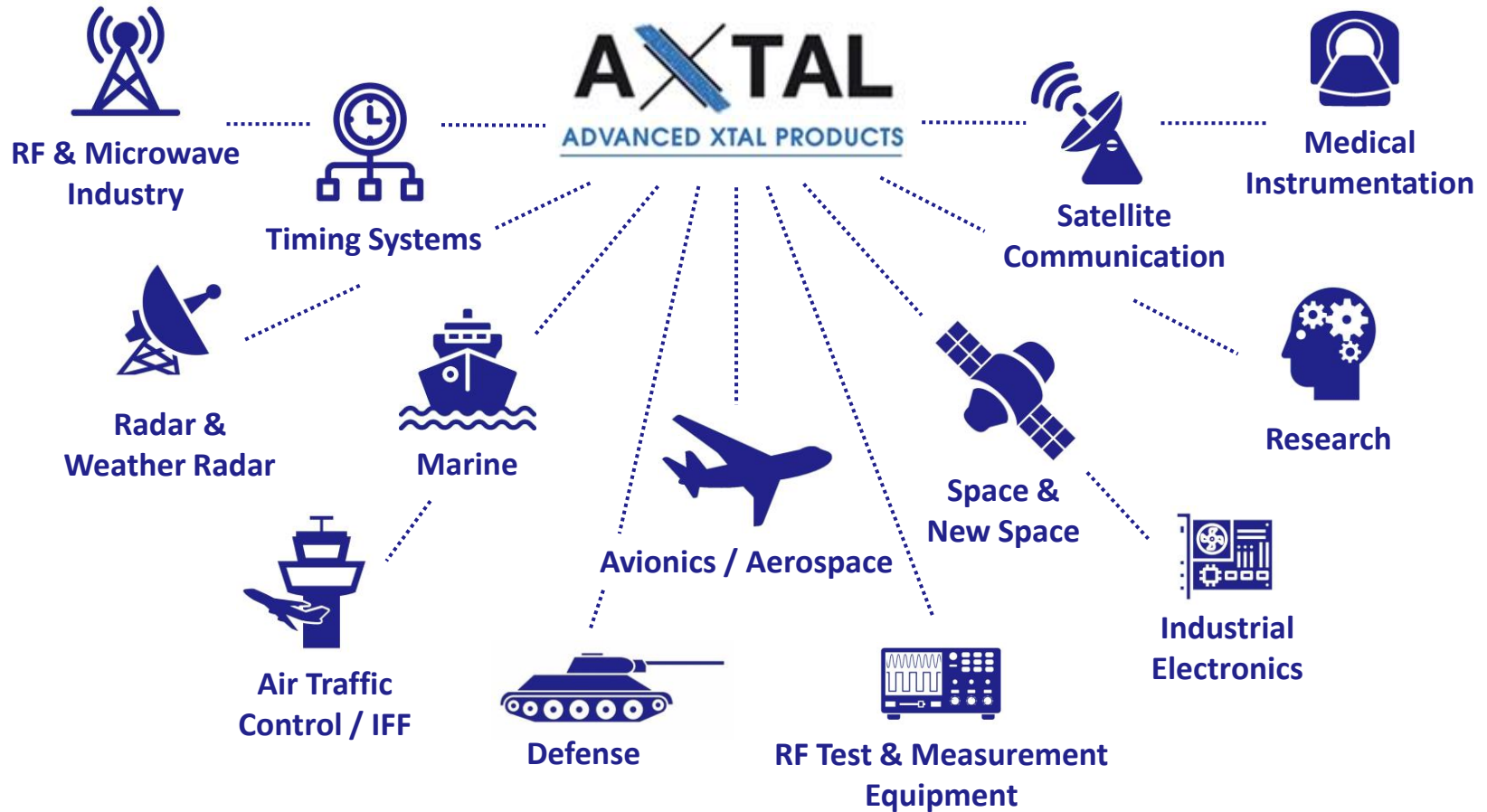
+49 6261 939836



www.axtal.com



# Markets served





# Main countries



Sales Representatives – See our Website



# Quality Management



- ✘ Since 2008: Quality management system in accordance with **ISO 9001:2015**, certified by TUEV SUED.
- ✘ Since 2024: Quality management system in accordance with **EN 9100:2018** (AS 9100), certified by TUEV SUED.
- ✘ AXTAL Quality System includes also:
  - ✘ **Extensive process control** for R&D, manufacturing and sales
  - ✘ **100% Incoming inspection** of all quality-critical components
  - ✘ **Extended testing** of quartz resonators incl. passive & active pre-aging
  - ✘ **Full traceability** of all test & measurement results
  - ✘ **100% Final test** of all key & critical parameters
  - ✘ **Workmanship** to J-STD-001, IPC-A-610 Class 3 and ESA ECSS standards



## Customer Audits

(not complete)



CHINA AEROSPACE SCIENCE AND TECHNOLOGY CORPORATION (CASC)



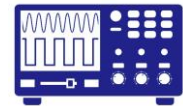




# Testing & Qualification



- ✘ **Inhouse Testing** of all electrical & environmental tests
- ✘ **Qualification Testing** to IEC 60679-4, MIL-PRF-55310, ESCC or Customer standards
- ✘ **AXTAL Test Capabilities – Electrical:**
  - ✘ **Crystal Testing** with Saunders, Kolinker and AXTAL Network Analyzer System
  - ✘ **Frequency Stability** over various parameters up to 20 GHz
  - ✘ **Output Waveform & Spectrum** up to 26 GHz
  - ✘ **Phase Noise** with R&S FSWP & FSPN and Agilent E5052B up to 26 GHz
  - ✘ **Short-term Stability** (ADEV) with Microchip 53100A down to 1E-18
  - ✘ **Long-term Stability** (Aging) measured against GPS-disciplined Atomic Clock
  - ✘ **G-Sensitivity** & Phase Noise under vibration (random & sine) 5 ~ 6000 kHz
  - ✘ **Temperature Testing** -55°C to +125°C
- ✘ **AXTAL Test Capabilities – Environmental:**
  - ✘ **Vibration Testing:** Mechanical Shock, Random & Sine
  - ✘ **Temperature Testing:** Thermal Shock, Storage & Burn-in -55°C to +150°C
  - ✘ **Vacuum Testing**
  - ✘ **Leak Testing**





# Production Environment

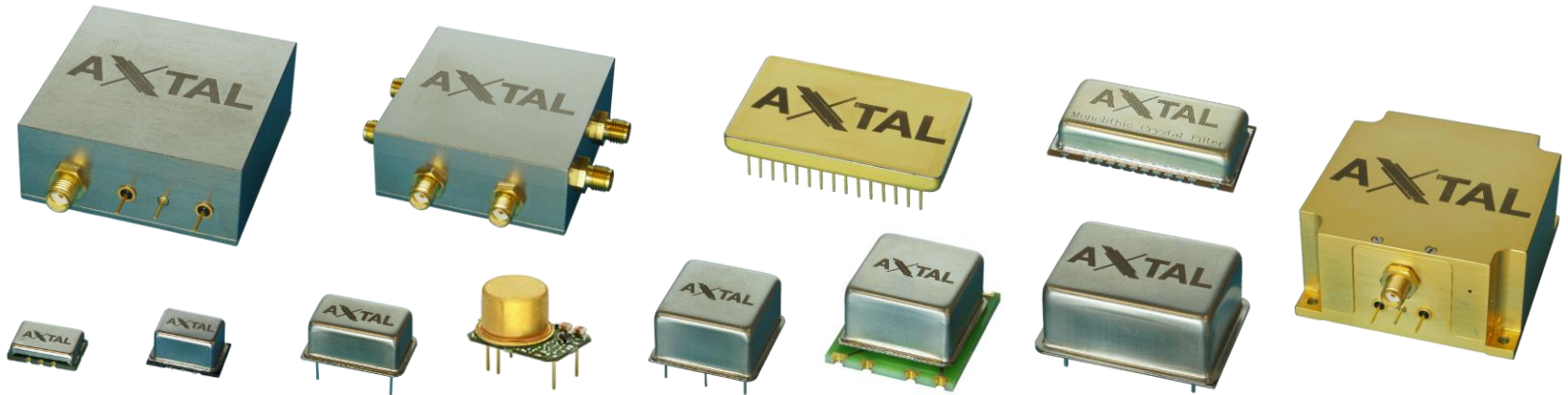






# Product Overview

SPXO    VCXO    TCXO    OCXO    PLXO    SAW    Space  
Masterclocks    Frequency References    Atomic Clocks



Expert for customized oscillators and modules

Ultra-low noise & Very high stability

Wide frequency range up to 10 GHz

Various packages: THD, SMD, Connectorized and 19" Rack

Screening & Inspection IAW MIL-PRF-55310 and others



# OCXO

## Product Overview



### Miniature 9x14 mm Package

- ✘ Smallest OCXO – Hermetically-sealed
- ✘  $\pm 5$  ppb,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$



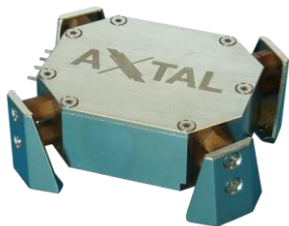
### Ultra-High Stability Double OCXO

- ✘ Eurocase 36x27 mm Package
- ✘  $\pm 0.05$  ppb,  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$



### Ultra-Low Noise

- ✘ Supreme close-in phase noise
- ✘ Noise floor down to  $-185$  dBc/Hz

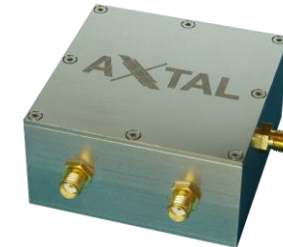


### Vibration-isolated

- ✘ G-Sensitivity down to  $0.001$   $\text{g}^2/\text{Hz}$
- ✘ Noise floor down to  $-180$  dBc/Hz
- ✘ Functional profile up to  $25$  g RMS
- ✘ Customized Absorbers

### Multiplied Ultra-Low Noise

- ✘ Up to  $7$  GHz
- ✘ Multiple Outputs
- ✘ Fully customizable



### Low Power Fast Warm-up

- ✘ Warm-up  $60$  sec
- ✘ Power Consumption  $< 300$  mW
- ✘ Small Size



# TCXO

## Product Overview



### Miniature SMD Packages

- ✗ 5x3.2 mm & 7x5 mm
- ✗ High Stability down to  $\pm 50$  ppb
- ✗ Low noise & Low g-Sensitivity

### High Stability

- ✗ Down to  $\pm 50$  ppb,  $-40 \sim +85^{\circ}\text{C}$
- ✗ Various packages available

### Ultra-Low Noise

- ✗ Low close-in phase noise
- ✗ Noise floor down to  $-180$  dBc/Hz
- ✗ Ultra-low phase jitter down to 10 fs

### Very wide temperature range

- ✗ Up to  $-55 \sim +125^{\circ}\text{C}$
- ✗ Various packages available

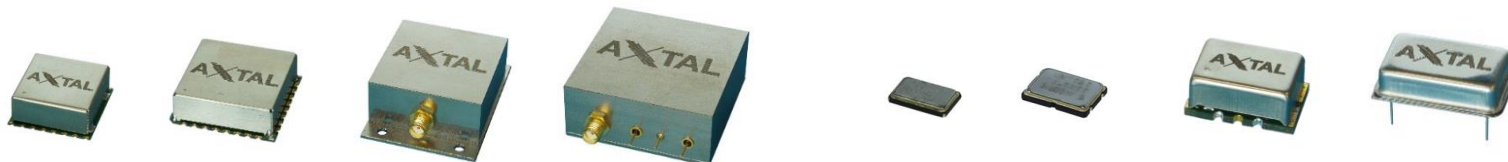


### High frequencies

- ✗ Up to 8 GHz using PLL or Multiplication
- ✗ Low phase noise & low phase jitter
- ✗ Various packages available

### Lowest Vibration Sensitivity

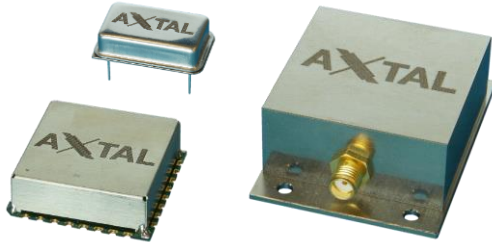
- ✗ G-Sensitivity down to 0.2 ppb/g
- ✗ Noise floor down to  $-180$  dBc/Hz
- ✗ Functional profile up to 25 g RMS





# Modules & Space

## Product Overview

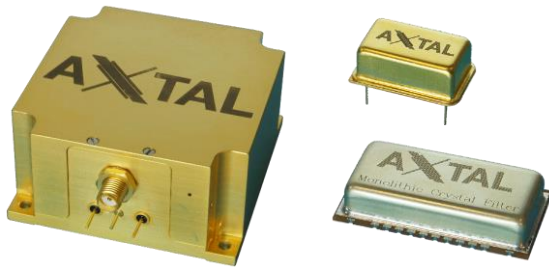
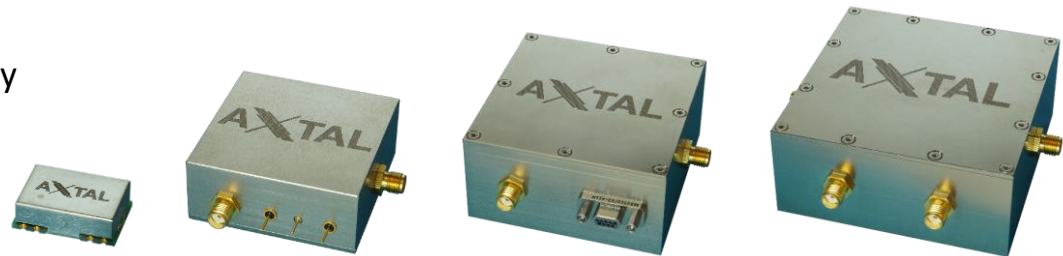


### GHz Crystal-Controlled Sources

- ✘ Various Gated Oscillators for Air Traffic Control and IFF
- ✘ PLL, Frequency Multiplication and SAW
- ✘ All stability classes up to 10 GHz

### PLL Oscillator Modules

- ✘ SPXO – TCXO – OCXO Stability
- ✘ Programmable models
- ✘ Multiple outputs
- ✘ Fully customizable



### Space & New Space

- ✘ SPXO – VCXO – TCXO – OCXO – Monolithic Crystal Filter
- ✘ MIL-PRF-55310 Level “S” and High Radiation Hardness
- ✘ Broad New Space Portfolio (see AXTAL Space Presentation)
- ✘ ESA EPPL Listed OCXO AXIOM6060
- ✘ Heritage: GEO, NCLE Moon Mission, LaRa/ExoMars etc.



# Frequency References & Distribution

## Product Overview



### Masterlocks

- ✘ Masterlocks for the most demanding Timing and Frequency Generation Systems
- ✘ Fully-customized in acc. with your requirements
- ✘ State-of-the-art Performance & Technology

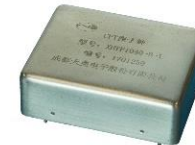


### Frequency Distribution

- ✘ Frequency References: OCXO – Rubidium – GPS-disciplined
- ✘ Ultra-Low Noise & Very High Stability
- ✘ Low Noise Distribution Amplifier up to 16 outputs

### Atomic Clocks

- ✘ Manufacturer: ELECSYN “Spaceon”
- ✘ Miniature CPT Atomic Clock
- ✘ Rubidium Clocks





# AXTAL Customers



CHINA AEROSPACE SCIENCE AND TECHNOLOGY CORPORATION (CASC)



ROHDE & SCHWARZ

ADVANTEST

CEIC 中国电科



indra





# AXTAL Website



[www.axtal.com](http://www.axtal.com)

- ✘ Find our Latest Updates & News
- ✘ Download Catalog and Datasheets
- ✘ Technical Notes & Archive
- ✘ Check out where you can meet us on Trade Shows & Conferences

WELCOME TO THE EXPERT FOR FREQUENCY CONTROL AND PIEZO SENSORS

OUR PRODUCTS		
<p><b>CRYSTAL OSCILLATORS</b></p> <ul style="list-style-type: none"> <li>✘ Packaged Xtal Oscillators / Clocks (SPXO)</li> <li>✘ Voltage Controlled Xtal Oscillators (VCXO)</li> <li>✘ Temp.-Compen. Xtal Oscillators (TCXO)</li> <li>✘ Oven Controlled Xtal Oscillators (OCXO)</li> <li>✘ SAW Oscillators (PSO, VCSO, OCSO)</li> <li>✘ Vibration Insensitive Oscillators</li> <li>✘ Oscillators for Aerospace &amp; Defence</li> <li>✘ Oscillators for Space Applications</li> </ul>	<p><b>OSCILLATOR MODULES</b></p> <ul style="list-style-type: none"> <li>✘ Modules for Aerospace &amp; Defence</li> <li>✘ Phase-Locked Oscillator Modules</li> <li>✘ GHz Crystal-Controlled Sources</li> <li>✘ Gated Crystal Oscillators for IFF</li> <li>✘ Masterclocks</li> </ul>	<p><b>FREQUENCY REFERENCE UNITS &amp; DISTRIBUTION</b></p> <ul style="list-style-type: none"> <li>✘ OCXO Frequency References</li> <li>✘ Miniature Atomic Clock</li> <li>✘ Rubidium Atomic Clocks</li> <li>✘ GPS-disciplined Oscillators</li> <li>✘ Distribution Amplifiers</li> </ul>
<p><b>MISCELLANEOUS PRODUCTS</b></p> <ul style="list-style-type: none"> <li>✘ Precision Crystals (Crown)</li> <li>✘ Quartz Crystal Units for Space Application</li> <li>✘ Crystal Filters for Space Application</li> <li>✘ Evaluation Boards</li> <li>✘ Frequency Counter Modules</li> </ul>	<p><b>PRODUCT SEARCH</b></p> <ul style="list-style-type: none"> <li>✘ Oscillator Search</li> <li>✘ Other Products</li> <li>✘ Catalog</li> <li>✘ Legacy Products</li> </ul>	<p><b>Q-TECH PRODUCTS</b></p> <ul style="list-style-type: none"> <li>✘ Q-Tech Corporation</li> <li>✘ Q-Tech Product Overview</li> <li>✘ Q-Tech Product Search</li> </ul>

